TETRA TECH

November 9, 2010

Mr. Roy Crossland
START Project Officer
U.S. Environmental Protection Agency, Region 7
901 North 5th Street
Kansas City, Kansas 66101

Subject: **Quality Assurance Project Plan**
Cozad Groundwater Site, Cozad, Nebraska
CERCLIS ID: NEN000705851
U.S. EPA Region 7 START 3, Contract No. EP-S7-06-01
Task Order No. 0002.059.001
Task Monitor: Brian Mitchell, Project Manager

Dear Mr. Crossland:

Tetra Tech EM Inc. is submitting the attached Quality Assurance Project Plan for a Vapor Intrusion Assessment at the Cozad Groundwater site in Cozad, Nebraska. If you have any questions or comments, please contact the project manager at (913) 707-1459.

Sincerely,

for

Laura Moore, RG, CHMM
START Project Manager

Ted Faile, PG, CHMM
START Program Manager

Enclosures

40339274
Superfund

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X9004.06.0002.059.001

QUALITY ASSURANCE PROJECT PLAN
FOR A VAPOR INTRUSION ASSESSMENT AT THE COZAD GROUNDWATER SITE
COZAD, NEBRASKA
CERCLIS ID: NEN000705851

Superfund Technical Assessment and Response Team (START)
Contract No. EP-S7-06-01, Task Order 0002.059.001

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
901 N. 5th Street
Kansas City, Kansas 66101

November 9, 2010

Prepared By:

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415 Oak Street
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for the Cozad Groundwater Site

Project Information:

Project Name: Cozad Groundwater		**City:** Cozad	**State:** NE
EPA Project Manager: Brian Mitchell		**START Project Manager:** Laura Moore	
Approved By: for L.M.		**Prepared For:** EPA Region 7 Superfund Division	
Title: START Project Manager	Date: 11/10/10		
Approved By:			
Title: START Program Manager	Date: 11/10/10		
Approved By: Kathy Homer		**Prepared By:** Laura Moore **Date:** November 2010	
Title: START QA Manager	Date: 11/10/10		
Approved By: Brian Mitchell			
Title: EPA Project Manager	Date: 11/17/10	**Tetra Tech START Project Number:** X9004.06.0002.059.001	
Approved By: Diane Harris			
Title: EPA Region 7 QA Manager	Date: 12/Nov/2010		

1.0 Project Management:

1.1 Distribution List

EPA—Region 7: Brian Mitchell, EPA Project Manager
Diane Harris, EPA Region 7 QA Manager

Tetra Tech START: Laura Moore, Project Manager
Kathy Homer, QA Manager

1.2 Project/Task Organization

Brian Mitchell, of the EPA Region 7 Superfund Division, will serve as the EPA project manager for the activities described in this QAPP. Laura Moore, of Seagull Environmental Technologies, Inc., a subcontractor to Tetra Tech EM, Inc. (Tetra Tech), will serve as the START project manager for field activities.

1.3 Problem Definition/Background:

Description: This site-specific Quality Assurance Project Plan form is prepared as an addendum to the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007), and contains site-specific data quality objectives for the sampling activities described herein.

☒ Description attached.
☐ Description in referenced report: _____ (Title) _____ (Date)

1.4 Project/Task Description:

☐ CERCLA PA ☐ CERCLA SI ☐ Brownfields Assessment ☐ Removal Action
☒ Other (description attached): ☐ Pre-CERCLIS Screening ☐ Removal Site Evaluation

Other Description: Vapor intrusion assessment

Schedule: Field work is scheduled for December 2010.

☐ Description in referenced report: _____ (Title) _____ (Date)

1.5 Quality Objectives and Criteria for Measurement Data:

a.	Accuracy:	☒ Identified in attached table.
b.	Precision:	☒ Identified in attached table.
c.	Representativeness:	☒ Identified in attached table.
d.	Completeness*:	☒ Identified in attached table.
e.	Comparability:	☒ Identified in attached table.

Other Description:

*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make decisions based on any or all of the remaining validated data. No "critical samples" have been identified for this project.

1.6 Special Training/Certification Requirements:

☒ OSHA 1910 ☒ Special Equipment/Instrument Operator (describe below): ☐ Other (describe below):

Sampling personnel will be experienced in Geoprobe® operation and in collection of soil gas samples.

1.7 Documentation and Records:

☒ Field Sheets ☒ Daily Log ☐ Trip Report ☒ Area Maps ☐ Video
☒ Chain of Custody ☒ Health and Safety Plan ☒ Letter Report ☒ Photos

☒ Sample documentation will follow EPA Region 7 SOP 2420.05.
☒ Other: Analytical information will be handled according to procedures identified in Table 2.

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2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

- ☐ Random Sampling
- ☐ Transect Sampling
- ☒ Biased/Judgmental Sampling
- ☐ Stratified Random Sampling
- ☐ Search Sampling
- ☐ Systematic Grid
- ☐ Systematic Random Sampling
- ☒ Definitive Sampling
- ☐ Screening wo/ Definitive Confirmation
- ☐ Screening w/ Definitive Confirmation
- ☒ Sample Map Attached

☒ Other (Provide rationale behind each sample): See Appendix A for additional sampling information.

The proposed sampling scheme will be judgmental, in accordance with the *Guidance for Performing Site Inspections Under CERCLA*, OSWER Directive #9345.1-05, September 1992, and *Removal Program Representative Sampling Guidance, Volume 1: Soil*, OSWER Directive 9360.4-10, November 1991. Judgmental sampling is the subjective (biased) selection of sampling locations based on historical information, visual inspection, and the best professional judgment of the sampler(s). See Appendices 1 and 2 for additional site-specific information and site maps.

Air and soil gas samples will be collected in Summa canisters. The proposed number of samples is a balance between cost and coverage, and represents a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical investigation of this type.

Sample Summary Location	Matrix	# of Samples*	Analysis
Inside residences and businesses	Indoor Air	8	VOCs
Outside of buildings	Ambient Air	1	VOCs
Sub-slab at residences and businesses	Soil Gas (Sub-Slab)	8	VOCs
Along street right-of-ways	Soil Gas	9	VOCs

*NOTE: Number is approximate and may change depending on site conditions. Background/QC samples are not included with these totals. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	EPA Region 7 SOP(s) or other Method
Indoor Air	Evacuated stainless steel Summa® canisters will be used to collect indoor air samples for analysis for VOCs. Calibrated flow regulators will allow the canisters to fill over a 24-hour period.	SOPs 2313.04 & 4231.1704
Ambient Air	Evacuated stainless steel Summa canisters will be used to collect ambient air samples for analysis for VOCs. Calibrated flow regulators will allow the canisters to fill over a 24-hour period.	SOPs 2313.04 & 4231.1704
Soil Gas (Sub-Slab)	Soil gas samples will be collected via disposable polyethylene tubing lowered through a drill hole in the foundation. Evacuated stainless steel Summa canisters will be used to collect soil gas samples for analysis for VOCs. Calibrated flow regulators will allow the canisters to fill over a 24-hour period.	Draft EPA SOP for Sub-Slab Sampling
Soil Gas	Soil gas samples will be collected with a Geoprobe® which will drive steel rods to the sampling depth. Evacuated stainless steel Summa canisters will be used to collect the soil gas samples for analysis for VOCs.	SOPs 4230.07 & 4231.2042

☐ Other Description:

2.3 Sample Handling and Custody Requirements:

- ☒ Samples will be packaged and preserved for field screening in accordance with procedures defined in Region 7 EPA SOP 2420.06.
- ☒ COC will be maintained for field screening as directed by Region 7 EPA SOP 2420.04.
- ☒ Samples will be accepted according to Region 7 EPA SOP 2420.01.
- ☐ Other (Describe):

2.4 Analytical Methods Requirements:

- ☒ Identified in attached table.
- ☒ Rationale: The requested analyses have been selected based on historical information about the area and program experience with similar types of sites.
- ☐ Other (Describe):

2.5 Quality Control Requirements:

- ☐ Not Applicable
- ☒ Identified in attached table.
- ☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- ☒ Field QC Samples: For this investigation, field QC samples will include one air (Summa) trip blank to assess transportation-related contamination. Evaluation of blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results of the blank sample will be evaluated on a qualitative basis by the EPA project manager and EPA contractor(s) to determine a general indication of field-introduced and/or analysis-introduced contamination. Because determination of relative percent difference will not be required for this project, no field duplicate samples will be collected.
- ☐ Other (Describe):

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☒ Testing, inspection, and maintenance of analytical instrumentation will proceed in accordance with the previously referenced SOPs and/or manufacturers' recommendations. Testing, inspection, and maintenance of field instruments (GPS units, etc.) will proceed in accordance with manufacturers' recommendations.

2.7 Instrument Calibration and Frequency:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☒ Calibration of laboratory equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.
☐ Other (Describe):

2.8 Inspection/Acceptance Requirements for Supplies and Consumables:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☒ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers.*
☐ Other (Describe):

2.9 Data Acquisition Requirements:

☐ Not Applicable
☒ In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☒ Previous data or information pertaining to the area (including other analytical data, reports, photos, maps, etc., that are referenced in this QAPP) has been compiled by EPA and/or its contractor(s) from other sources. Some of that data have not been verified by EPA and/or its contractor(s); however, that unverified information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data or information.
☐ Other (Describe):

2.10 Data Management:

☒ All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01.
☐ Other (Describe):

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

☒ Peer Review ☒ Management Review ☐ Field Audit ☐ Lab Audit
☒ Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
☐ Other (Describe):

3.1A Corrective Action:

☒ Corrective actions will be at the discretion of the EPA project manager whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the area.
☐ Other (Describe):

3.2 Reports to Management:

☐ Audit Report ☐ Data Validation Report ☐ Project Status Report ☐ None Required

☒ A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared by START and submitted to the EPA.
☒ Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☐ Other (Describe):

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4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

☐ Identified in attached table.
☒ Data review and verification will be performed in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
☒ Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.06 and 2430.12.
☐ Other (Describe):

4.2 Validation and Verification Methods:

☐ Identified in attached table.
☒ The data will be validated in accordance with Region 7 EPA SOPs 2430.06 and 2430.12.
☒ The EPA project manager will inspect the data to provide a final review. The EPA project manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and the trip blank to ensure the data are acceptable. The EPA project manager will also compare the sample descriptions with the field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
☒ Other (Describe):

4.3 Reconciliation with User Requirements:

☐ Identified in attached table.
☒ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded, and re-sampling or re-analysis of the subject samples may be required by the EPA project manager.
☐ Other (Describe):

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Table 1: Sample Summary

Project Name: Cozad Groundwater				**Location:** Cozad, Nebraska; See Appendix B, Figure 1			
START Project Manager: Laura Moore				**Activity/ASR #:** To be determined			**Date:** November 2010
No. of Samples	**Matrix**	**Location**	**Purpose**	**Depth or other Descriptor**	**Requested Analysis**	**Sampling Methods**	**Analytical Method**
8	Indoor Air	Inside residences and business in the vicinity of previously identified PCE plume	To assess whether airborne site-related compounds are present inside the buildings	N/A	VOCs	EPA SOPs 2313.04 & 4231.1704	EPA SOP 3230.04
1	Ambient Air	Outside of buildings	To assess ambient air quality	N/A	VOCs	EPA SOPs 2313.04 & 4231.1704	EPA SOP 3230.04
8	Soil Gas (Sub-Slab)	Beneath residences and business in the vicinity of previously identified PCE plume	To assess whether site-related compounds are present below the buildings	Below slabs	VOCs	Draft EPA SOP for Sub-Slab Sampling	EPA SOP 3230.04
9	Soil Gas	Along street right-of ways	To assess whether site-related compounds are present in the vadose zone near source areas	8 feet bgs	VOCs	4230.07 & 4231.2042	EPA SOP 3230.04
Background Samples							
1	Indoor Air	Upgradient of study area	To determine indoor background concentrations of VOCs	N/A	VOCs	EPA SOPs 2313.04 & 4231.1704	EPA SOP 3230.04
1	Soil Gas (Sub-Slab)	Upgradient of study area	To determine background concentrations of VOCs in sub-slab soil gas	Below slab	VOCs	Draft EPA SOP for Sub-Slab Sampling	EPA SOP 3230.04
1	Soil Gas	Upgradient of study area	To determine background concentrations of VOCs in the vadose zone	8 feet bgs	VOCs	4230.07 & 4231.2042	EPA SOP 3230.04
QC Samples							
1	Air (Summa canister)	Trip blank	To assess field/transportation-related contamination	N/A	VOCs	N/A	EPA SOP 3230.04

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Table 2: Data Quality Objective Summary

Project Name: Cozad Groundwater		**Location:** Cozad, Nebraska; See Appendix B, Figure 1						
START Project Manager: Laura Moore		**Activity/ASR #:** To be determined					**Date:** November 2010	
Analysis	**Analytical Method**	**Data Quality Measurements**					**Sample Handling Procedures**	**Data Management Procedures**
		Accuracy	**Precision**	**Representativeness**	**Completeness**	**Comparability**		
INDOOR AND AMBIENT AIR & SOIL GAS								
VOCs	see Table 1	per analytical method	per analytical method	judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.

APPENDIX A

SITE-SPECIFIC INFORMATION FOR THE COZAD GROUNDWATER SITE

INTRODUCTION

The Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has been tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct a vapor intrusion assessment at the Cozad Groundwater site in Cozad, Nebraska (see Appendix B, Figure 1). The assessment is being conducted to determine if tetrachloroethylene (PCE); trichloroethylene (TCE); and benzene, toluene, ethylbenzene, and xylenes (BTEX) contamination in groundwater may present a threat to human health via indoor vapor intrusion into residences and workplaces.

This quality assurance project plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for the vapor intrusion assessment.

SITE DESCRIPTION

The site includes a contaminated public water supply well (59-1) for the City of Cozad, Nebraska. Cozad is a small farming and manufacturing town with a population of about 4,100. The town was founded in 1872, when a branch of the Union Pacific Railroad reached the area. The town now supports a mix of agricultural businesses, light industry, and heavy manufacturing. Since the mid-1980s, samples collected from municipal well 59-1 have contained the chlorinated volatile organic compound (VOC) PCE at concentrations that exceed EPA's maximum contaminant level (MCL) of 5.0 micrograms per liter (µg/L) (Tetra Tech 2007).

Cozad is located in west-central Dawson County, in south-central Nebraska. The town lies in the Middle Platte drainage basin, on the northern bank of the Platte River. The site is roughly bounded by the following geographic coordinates: 40.8625° north latitude and 99.9957° west longitude (northwest corner); 40.8625° north latitude and 99.9714° west longitude (northeast corner); 40.8500° north latitude and 99.9957° west longitude (southwest corner); and 40.8500° north latitude and 99.9714° west longitude (southeast corner). These coordinates roughly correspond to the area between 11th Street and Interstate 80 (north to south), and between Locust Street and Dawson County Drainage Ditch No. 4 (east to west). This area includes the Union Pacific Railroad track, a Tenneco Automotive (Tenneco) facility, and two former Hunt Cleaners facilities at 600 West U.S. Highway 30 and 710 Meridian Avenue. The area also includes (active and abandoned) municipal wells 53-1, 59-1, 64-1, 65-1, 67-1, 67-2, 72-1, 94-1, 2006-1, and 2006-2 (see Appendix B, Figure 1). Of these wells, only 59-1 is known to be contaminated with PCE, although TCE has been detected in other municipal wells in the past.

The Cozad public water system (PWS) serves about 4,100 persons through six active wells. The leading well for pumping on any given day is alternated among wells 85-1, 94-1, 2006-01, and 2006-02. However, well 85-1 may be pumped slightly more than the other wells (Tetra Tech 2008). Wells 63-1 and 65-1 are also pumped during times of peak demand, such as the summer months (Tetra Tech 2008). Well 53-1, which had functioned as a surplus capacity source for fire suppression or other emergency needs (Tetra Tech 2005), was plugged in September 2007 (Tetra Tech 2008). Well 59-1, formerly listed as a standby well, was abandoned in 2006 because of elevated arsenic concentrations (Tetra Tech 2007). Well 85-1, northwest of town, was installed to replace wells 64-1 and 72-1, which had been removed from service because of TCE contamination from the Tenneco site. Three other wells (66-1, 67-1, and 67-2) were also reportedly removed from service because of contamination from Tenneco. Wells 67-1 and 67-2 were located east (downgradient) of the Tenneco facility; however, well 66-1 was located near the municipal airport northwest (upgradient) of Tenneco. Well 94-1, located east of town, was added to replace these wells (Tetra Tech 2005). Groundwater sampling results for well 59-1 from 1987 through 2005 indicated the presence of PCE at concentrations between 0.67 and 7.9 µg/L.

The bedrock underlying the area of the site is the Tertiary Ogallala Formation. The Ogallala consists of complex deposits of sand, silt, clay, and gravel interbedded with lime- or silica-cemented sandstone. Thicknesses of individual layers differ significantly over short lateral and vertical distances. Groundwater flow at the site is assumed to follow the regional flow, generally east-southeastward towards and with the Platte River (University of Nebraska – Lincoln [UNL] 1980, 1998). According to well logs for registered wells in the area, the overburden thickness is approximately 5 to 17 feet and is composed primarily of clay, which overlies interbedded clay, sand, gravel, and sandstone. Depth to groundwater is 5 to 24 feet below ground surface (bgs) (Nebraska Department of Natural Resources [NDNR] 2010). Municipal well information is provided in Table 1, and well locations are shown on Figure 1 in Appendix B.

PREVIOUS INVESTIGATIONS

Previous environmental investigations in Cozad have focused on:

- The Tenneco facility at 121 Meridian Avenue
- The Nebraska Plastics facility at 700 West U.S. Highway 30
- The former Hunt Cleaners facility at 600 West U.S. Highway 30
- The former Hunt Cleaners facility at 710 Meridian Avenue.

TABLE 1

COZAD, NEBRASKA PUBLIC WATER SUPPLY WELLS

Well Number	Well Registration Number	Well Depth (feet bgs)	Screened Interval (feet bgs)	Static Water Level (feet bgs)	Pumping Rate (gpm)	Remarks
Active Wells						
63-1	G-074086	267	222 - 267	8	800	Peak demand only
65-1	G-074087	370	340 - 370	Unknown	1,000	Peak demand only
85-1	G-069999	380	228 - 380	7	2,000	Slightly predominant
94-1	G-083024	405	288 - 403	10	900	
2006-01	G-074082R	433	340 - 380 405 - 430	15	1,100	
2006-02	G-074082	425	280 - 370 400 - 420	13	1,100	
Abandoned Wells						
53-1	G-074082	192	172 - 192	Unknown	700	Shallow well; abandoned for new well
59-1	G-074090	240	200 - 240	Unknown	700	Abandoned due to high arsenic
64-1	Unknown	312	264 - 312	Unknown	Unknown	Abandoned due to VOCs
66-1	Unknown	405	Unknown	Unknown	Unknown	Abandoned due to VOCs
67-1	Unknown	200	180 - 200	Unknown	Unknown	Abandoned due to VOCs
67-2	Unknown	40	30 - 40	Unknown	Unknown	Abandoned due to VOCs
72-1	Unknown	420	350 - 420	Unknown	Unknown	Abandoned due to VOCs

Notes:

bgs Below ground surface
gpm Gallons per minute
VOC Volatile organic compound

The Nebraska Department of Environmental Quality (NDEQ) has conducted several investigations of contamination identified in the Cozad PWS. The Nebraska Plastics facility was evaluated as a potential contaminant source for the Cozad PWS in a Preliminary Assessment (PA) and Site Inspection (SI) conducted in December 2004 and March 2005 by Tetra Tech under contract to NDEQ (Tetra Tech 2005). Additional investigation of the Cozad PWS site was conducted in 2007 (Tetra Tech 2007). Other potential sources evaluated in the Cozad PWS investigations included Tenneco and the two former Hunt Cleaners (Hunt) dry cleaning facilities.

The Tenneco (formerly Monroe Automotive Equipment) facility is located at 121 Meridian Avenue (see Appendix B, Figure 1). Tenneco has been the subject of ongoing environmental investigations since 1984 and is under Resource Conservation and Recovery Act (RCRA) enforcement action (EPA 2008). The site is the source of a TCE plume that underlies much of Cozad and has resulted in the closure of a number of Cozad PWS wells. PCE has been detected in Tenneco monitoring wells, including on-site wells.

Because groundwater is being drawn toward Tenneco's high-volume extraction wells at the facility from all directions, the PCE in on-site Tenneco wells could have originated off site (Tetra Tech 2007).

Hunt Cleaners is an industrial dry cleaner currently located at 604 West 2nd Street (see Appendix B, Figure 1). From about 1985 until March 2004, when it was destroyed by a fire, Hunt Cleaners was located at 600 West U.S. Highway 30. Hunt Cleaners also had operated at 710 Meridian Avenue from about 1954 to 1986. That location is about 0.4 mile further southeast, downgradient of the Highway 30 site. Hunt used PCE in its cleaning processes prior to 1988; however, it currently uses Stoddard solvent (Tetra Tech 2007).

A Phase II environmental site assessment (ESA) was conducted by Milco Environmental Services (Milco) at the former Hunt Cleaners site at 600 West U.S. Highway 30 after the 2004 fire. The Phase II ESA report indicated that this location had been a farm implement dealership prior to use by Hunt Cleaners. The investigation found high concentrations of PCE and other VOCs, including free petroleum product, in shallow groundwater on the property. The Phase II ESA also found hydrocarbons and waste oil in soil samples collected at less than 5 feet bgs, with a maximum of 56,000 milligrams per kilogram (mg/kg) of waste oil and 7,000 mg/kg purgeable hydrocarbons detected in the samples. Five monitoring wells (MW) were installed on the property. Light non-aqueous phase liquid (LNAPL) was detected in two of the wells (MW-2 and MW-3), with a maximum LNAPL thickness of 0.59 feet. VOCs, including PCE, were detected in groundwater collected from about 15 feet bgs in wells MW-2, MW-3, and MW 5 (see Table 2) (Tetra Tech 2007). NDNR database records for registered wells indicate that wells MW-2 and MW-3 are located in the general building area, while MW-5 is to the southeast (NDNR 2010).

TABLE 2

GROUNDWATER RESULTS FOR FORMER HUNT CLEANERS SITE
600 W. U.S. HIGHWAY 30
AUGUST 2004

Compound	MCL (µg/L)	MW-2 (µg/L)	MW-3 (µg/L)	MW-5 (µg/L)
Ethylbenzene	700	**7,068**	**26,700**	Not detected
Tetrachloroethylene	5	**1,280**	**6,100**	7
Toluene	1,000	**42,293**	**127,500**	Not detected
Trichloroethylene	5	**284**	**1,500**	Not detected
Xylenes, total	10,000	**47,378**	**157,200**	Not detected

Notes:

Bold font indicates the concentration exceeds the MCL.

MCL Maximum contaminant level
µg/L Micrograms per liter

In April and June 2005, Milco conducted a followup investigation, installing an additional six monitoring wells on and around the former Hunt Cleaners facility. Five of the six new wells and four of the original five wells were sampled in April 2005; wells MW-3 and MW-7 were not sampled because of the presence of free petroleum product in the wells. MW-7 was installed northeast of MW-5 on the eastern (downgradient) property line. As a result of the free product found in MW-7, four additional monitoring wells were installed and sampled in June 2005. PCE was detected in groundwater collected from wells MW-2 (32 µg/L), MW-5 (2 µg/L), and MW-6 (6 µg/L); however, PCE was not detected in off-site downgradient wells (Tetra Tech 2007). NDNR records indicate that wells MW-6, MW-7, and MW-8 are located generally east (downgradient) of the former Hunt Cleaners building (NDNR 2010).

Table 3 shows locations and depths of soil samples collected during the Milco investigation of the Hunt facility that contained detectable concentrations of PCE. Concentrations of PCE exceeded the NDEQ Residential Remediation Goal and Migration to Groundwater Goal in the soil samples collected from borings at MW-7 and MW-8. NDNR records indicate the location of SB-1 was near the east side of the former building, just southwest of MW-3, and the location of MW-10 was generally north of the former Hunt Cleaners building (NDNR 2010).

TABLE 3

SOIL RESULTS FOR FORMER HUNT CLEANERS SITE
600 W. U.S. HIGHWAY 30
APRIL 2005

Soil Sample Location Description	Depth (ft bgs)	Tetrachloroethylene (mg/kg)
SB-1 (east of building)	1 - 3	0.016
SB-1 (east of building)	3 - 5	0.049
MW-7 (east property line)	7 - 9	**2.173**
MW-8 (north of MW-7)	7 - 9	**1.753**
MW-10 (north of building)	1 - 3	0.003
NDEQ Industrial Remediation Goal		15
NDEQ Residential Remediation Goal		0.6
NDEQ Migration to Groundwater Remediation Goal		0.058

Notes:

Bold font indicates concentration exceeds a NDEQ voluntary cleanup standard.
Soil cleanup levels are taken from the NDEQ voluntary cleanup program guidance (NDEQ 2005).

ft bgs Feet below ground surface
mg/kg Milligrams per kilogram
NDEQ Nebraska Department of Environmental Quality

The NDNR registered wells database indicates that 12 monitoring wells ranging from 13.5 to 15 feet deep are currently registered for the Hunt Cleaners facility. In addition, two 25-foot-deep recovery wells and an 8-foot-deep, soil vapor extraction well are registered at the site. The NDNR database also indicates that 150 other monitoring wells are located within 1 mile of the Nebraska Plastics facility. Of these, 134 are associated with the Tenneco/Monroe site, and 16 are associated with a leaking underground storage tank site at a grain elevator about 0.5 mile southeast of Nebraska Plastics (NDNR 2010).

The NDEQ PA/SI of the Cozad PWS site was conducted in two stages. In December 2004, groundwater samples were collected at 50 feet bgs and at the depth of refusal (ranging from 63 to 110 feet bgs) from nine temporary direct-push technology (DPT) wells around Cozad. VOCs were detected in only one of those groundwater samples. This sample was collected at 50 feet bgs downgradient of the Tenneco facility; no PCE was identified in this sample (Tetra Tech 2005).

In March 2005, groundwater samples were collected from DPT temporary wells at 23 locations, generally along suspected migration pathways from potential source areas to municipal well 59-1. Samples were collected at depths of 10 to 20 feet bgs. No PCE was identified in those samples. During the March 2005 sampling event, one soil sample was found to contain PCE. The sample was collected from the northeastern corner of Avenue M and West U.S. Highway 30. This sample—CPWS-23-SL—contained 7.9 micrograms per kilogram of PCE and was collected from a depth of about 0.5 feet bgs. Four other soil samples were collected on the public right-of-ways around the Hunt Cleaners (600 W. Hwy 30) property; however, none contained detectable concentrations of PCE (Tetra Tech 2005).

In January 2007, NDEQ conducted a second site investigation. As part of this investigation, 31 groundwater samples were collected from nine locations on and around the former Hunt Cleaners facility at 710 Meridian Avenue and near well 59-1. PCE was reported by the on-site mobile laboratory at a concentration of 16 µg/L in sample TW-1-10, and at 5 µg/L in TW-2-10. These samples were both collected from 10 feet bgs near the back door of the former 710 Meridian Avenue Hunt Cleaners facility (Tetra Tech 2007).

In February 2008, EPA completed a Pre-CERCLIS Screening Site Assessment (SSA) Report for groundwater in the Cozad area, which concluded that a PA should be performed at the Nebraska Plastics site (EPA 2008). No release from the Nebraska Plastics facility was established during the August 2008 PA (Tetra Tech 2008).

SAMPLING STRATEGY AND METHODOLOGY

The sampling activities are tentatively scheduled to begin the week of December 13, 2010, and will require approximately 4 days to complete. Anticipation is that two Tetra Tech START members will be required to perform the activities described in this QAPP. When applicable, the standard operating procedures (SOP) and chain-of-custody (COC) procedures referenced in the QAPP will be followed throughout the sampling activities to verify the integrity of the samples from the time of collection until submittal to the laboratory for analysis. Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific Health and Safety Plan (HASP) prepared by Tetra Tech START. Most IDW is expected to consist of disposable sampling supplies (gloves, paper towels, etc.) that will be disposed of off site as uncontaminated solid waste.

Air Sampling

Nine indoor air samples will be collected from residences and businesses (including one indoor background location) in the site area (at or adjacent to the former Hunt Cleaners facilities located at 600 West U.S. Highway 30 and 710 Meridian Avenue [now First United Methodist Church thrift store], downgradient [east] of the former Hunt Cleaners facilities, and at the Tenneco facility). The samples will be collected from indoor living areas or active business spaces at each location. For the indoor air sampling, Summa® canisters will be fitted with flow regulating devices to enable collection of air samples for a continuous 24-hour period. All Summa sampling will be conducted in accordance with EPA Environmental Response Team SOP 4231.1704 – Summa Canister Sampling. In addition to the indoor air samples, one sample will be collected from an outside (ambient air) location. The ambient air sample will also be collected over a 24-hour period. Pertinent data, including analyses to be performed and exact sample locations, will be recorded on a field sheet for each sample. Table 4 summarizes the proposed sample locations, which are also displayed on Figure 2 in Appendix B.

Prior to indoor air sampling, START will contact all owners and/or tenants of proposed indoor air sampling locations and request that any stored chemical materials and fuels that may contribute VOCs to indoor air be either sealed in plastic bags or removed from the premises several days prior to sampling to minimize introduction of VOCs from other sources (i.e., other than from a subsurface source).

TABLE 4

INDOOR AIR AND SUB-SLAB SOIL GAS SAMPLE LOCATIONS
COZAD GROUNDWATER SITE, COZAD, NEBRASKA

Sample Address	Sample Location	Sample Type(s)
710 Meridian Avenue – 1st United Methodist Church thrift store	Cashier area	Indoor air / Sub-slab
122 E. 7th Street – Cozad Telephone Co.	Office	Indoor air / Sub-slab
113 E. 7th Street – Residence	1st floor living room	Indoor air / Sub-slab
Avenue O – Muny Park	Background location – Maintenance Building	Indoor air / Sub-slab
901 L Street – Cozad Housing Authority apartments	Living rooms in two apartments	Indoor air / Sub-slab
West of apartments at 901 L Street	Outside	Outside – ambient air
121 Meridian Avenue – Tenneco facility	Three locations in facility	Indoor air / Sub-slab

Soil Gas/Sub-Slab Sampling

Nine sub-slab soil gas samples (including one background sample) will be collected from beneath the foundations of the structures where indoor air samples are collected. These samples will be collected by penetrating the concrete floor in the basement or other accessible portion of the foundation with a rotary hammer drill and concrete bit. Disposable 0.25-inch-diameter polyethylene tubing will be lowered through the drill hole into the sub-slab material, and then the tubing annulus will be sealed with cement grout. A Swagelok® fitting will be attached to the top of the tubing to allow its connection to an evacuated Summa canister for sampling. The Summa canister will be fitted with a flow regulator to enable collection of sub-slab vapor samples over a continuous 24-hour period. Sub-slab vapor sampling will be conducted in accordance with procedures in the draft SOP for Installation of Sub-Slab Vapor Probes and Sampling Using EPA Method TO-15 to Support Vapor Intrusion Investigations. Table 4 summarizes the proposed sample locations, which are also displayed on Figure 2 in Appendix B.

In addition, 10 soil gas samples (including one background sample) will be collected from the vadose zone along road right-of-ways in the vicinity of the source areas. The purpose of these samples is to evaluate the potential for VOCs in groundwater to impact indoor air quality of overlying residences and businesses via vapor intrusion. Soil gas samples will be collected from depths of approximately 8 feet bgs, using a Geoprobe® direct-push apparatus. For each sample, steel rods will be driven to the sampling depth, the rods will be pulled back to provide a void space of approximately 1 foot, and disposable polyethylene tubing will be secured to the bottom of the rod string. Ambient air in the tubing will then be purged with a vacuum pump, and the upper end of the tubing will then be connected to an evacuated

Summa canister. A valve on the canister will be opened, and the canister will be allowed to fill with soil gas vapors. Proposed sample locations are depicted in Appendix B, Figure 2.

QUALITY CONTROL

Indoor air, sub-slab soil gas, and vadose zone soil gas samples will be collected from one off-site (upgradient) location. To evaluate sample quality control (QC), one trip blank will be collected, as specified in Section 2.5 of the QAPP form. An ambient air sample will also be collected for comparative purposes.

IDW, which will consist primarily of used gloves, used tubing, etc., will be disposed of as uncontaminated solid waste. Issues pertaining to decontamination of personnel and sampling equipment will be addressed in a site-specific HASP to be developed by START.

ANALYTICAL METHODS

Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help ensure that representative analytical results are obtained. All samples will be submitted to the EPA Region 7 laboratory in Kansas City, Kansas, for VOCs analysis. An Analytical Services Request form will be completed by the Tetra Tech START Project Manager and submitted to the EPA Region 7 laboratory. Submittal of samples to the laboratory is expected in December 2010. All samples will be analyzed according to SOPs and methods referenced on the QAPP form. Standard turnaround times and detection limits for those methods will be adequate for this project.

REFERENCES

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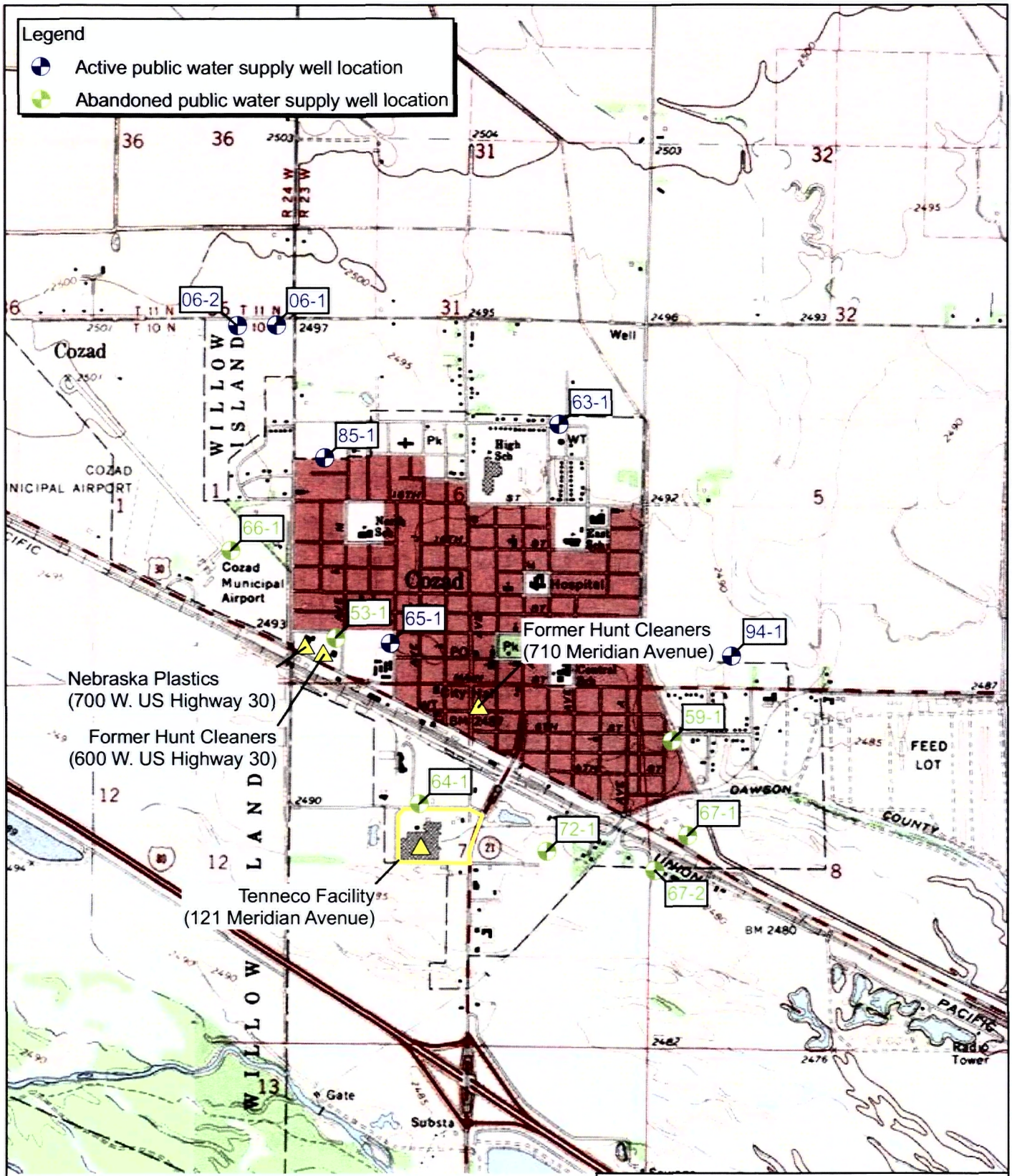
University of Nebraska – Lincoln (UNL). 1980. Configuration of the Water Table, Spring 1979, Grand Island Quadrangle, Nebraska.

UNL. 1998. *The Groundwater Atlas of Nebraska.*

APPENDIX B

FIGURES



N

0 1,000 2,000

Feet

Source: USGS Cozad, NE 7.5 Minute Topo Quad, 1971
USGS Cozad NW, NE 7.5 Minute Topo Quad, 1971
USGS Gothenburg SE, NE 7.5 Minute Topo Quad, 1970
USGS Willow Island, NE 7.5 Minute Topo Quad, 1970

Cozad Groundwater Site
Cozad, Nebraska

Figure 1
Source Areas and PWS Well Locations

TETRA TECH EM INC.

Date 11/09/10 Drawn By Gustavo Orozco Project No X9004.L.06.002.059.001

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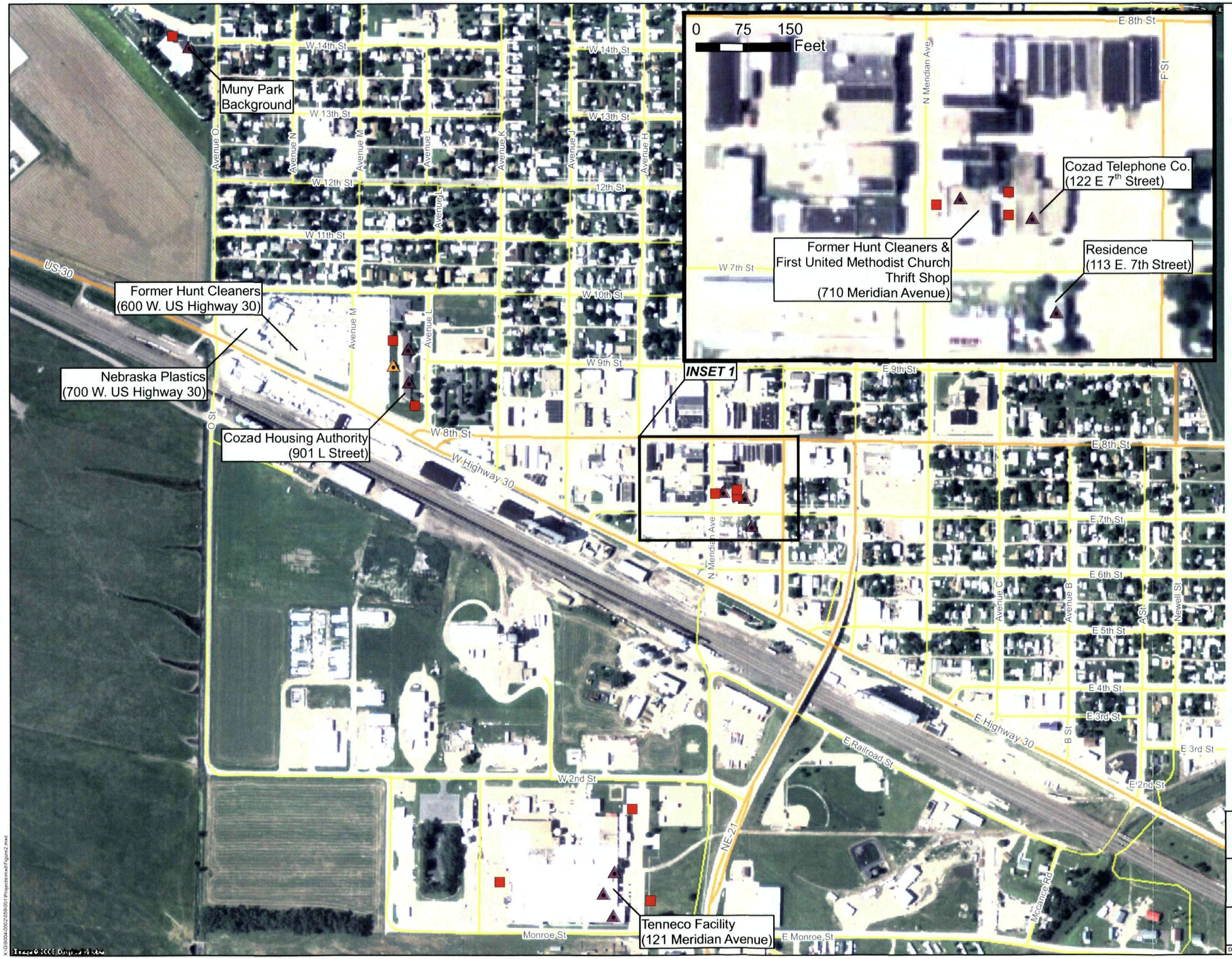

Legend

- Proposed ambient air and vadose soil gas sample location
- Proposed indoor air and sub-slab soil gas sample location
- Proposed vadose soil gas sample location
- Major road
- Street

N

0 250 500 Feet

Source: GlobeXplorer Aerial Imagery, DigitalGlobe, 2009; HSIP Gold, 2007.

Cozad Groundwater Site
Cozad, Nebraska

Figure 2
Proposed Sampling Locations

TETRA TECH EM INC.

Date: 11/09/10 Drawn By: Gustavo Orozco Project No: X9004 L 06 002 059 001

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